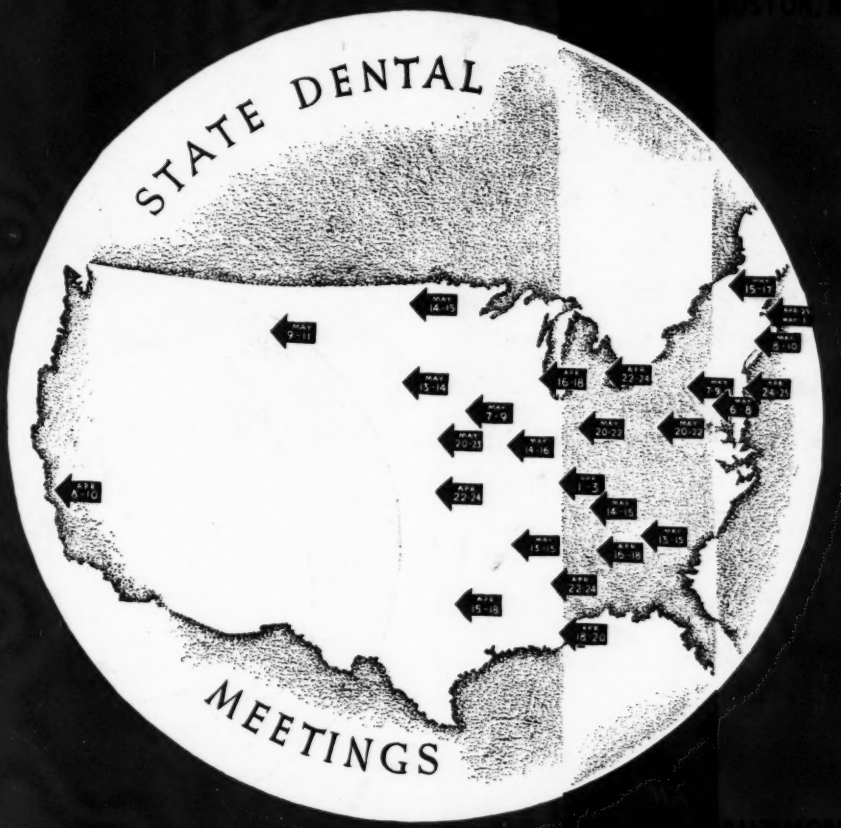
The DENTAL DIGEST



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The DENTAL DIGEST

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SURGICAL RESECTION OF A BENIGN NEOPLASM

DONALD M. GALLIE, JR., D.D.S.
Chicago

JANUARY 5, 1932, a patient was referred to our offices for the construction of a maxillary denture that would give satisfactory esthetic and functional results. Oral examination revealed that certain pathologic soft tissue processes had developed which would have to be corrected before construction of a prosthetic restoration could be instituted.

Report of Case

The patient, a housewife, aged 55, was well nourished and in good health.

Family History—The family history was one of longevity with excellent health of the parents and immediate members of the family. The husband had enjoyed good health during their married life of twenty years. The children were in good health, and had been normally delivered; there had been no miscarriages or stillbirths.

Physical Examination—No organic or demonstrable functional involvement was disclosed. The blood Wassermann reactions were negative. Blood examination and chemical analysis of the blood disclosed no dyscrasia or unusual conditions beyond the normal limits of individual variation. Urinalysis was normal.

Oral Examination and History—The patient had a full complement of vital teeth in the mandibular arch without periodontal degeneration and the mucosa of the lower lip, cheeks and floor of the mouth was normal. Fifteen years previous to examination all teeth in the maxillary arch were extracted because of extensive caries and pulp involvement, at which time a denture had been made. The patient reports that this denture had at no time been functionally satisfactory and comfortable. In the following seven years two subsequent dentures had been made which were equally uncomfortable. At the time of our examination, the patient was wearing the last denture which had been constructed seven years before, and which she had worn constantly. During that entire period it had been of little functional value, and for months after it had been inserted, it caused severe pain and soreness. This denture was found to be ill-fitting, unstable and so constructed as to be a highly irritating and traumatizing agent, causing inflammation and degenerative change to the mucoperiosteum of the edentulous maxillary area.

On removal of the maxillary denture it was apparent that two large folds of what seemed to be hyperplastic soft tissue had developed. One of these folds extended from above the right first bicuspid area to the left bicuspid area, involving the crest of the anterior alveolar ridge between these two landmarks. From the right bicuspid area to the left bicuspid area a second fold of what seemed to be hyperplastic tissue involved the mucosa at the labio-alveolar sulcus, while superimposed upon this soft tissue overgrowth was a distinct tumor extending from the right bicuspid area to the right central incisor region (Fig. 1). This mass was about 3 cm. in length, 1 cm. in width, and about 0.5 cm. in thickness. It was motile, broadly pedunculated, and had a broad indurated base which seemed to adhere to the bone or periosteum. This mass was dense and indurated. In color it was distinctly different from the adjacent normal mucosa. It was of a dark purple tinge, with a small ulcerated area, 2 or 3 mm. in circumference at the lower border of the mass. This mass was first noticed by the patient about three years before examination, and according to the history given us, it had developed in size slowly but consistently over this period. The mass had caused no pain other than the initial soreness induced when the dentures were first inserted, and the continuous traumatic irritation, caused by the labial-superior border of the denture pressing or cutting into the broad pedicle of the mass.

Fig. 1—Tumor on soft tissue extending from right bicuspid to right central incisor area.

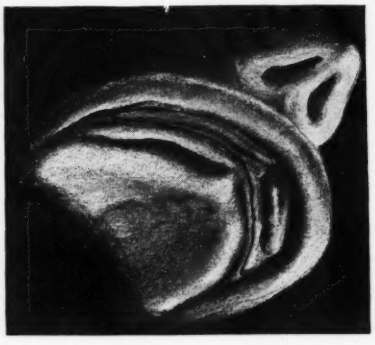


Fig. 2—Incised area including fold of hyperplastic tissue along labio-alveolar sulcus.

On palpation the cervical glands were found not to be enlarged nor could tenderness be elicited by deep palpation of the structures of the neck or floor of the mouth. The tongue, floor of the mouth, fauces, and soft palate were in no way involved.

Tentative Diagnosis—A tentative diagnosis was made of marked hyperplasia of the mucosa caused by traumatic injury and irritation of the denture; in addition, the development of an unclassified neoplastic growth.

Prognosis—Because of the slowness of growth, the size and pedunculated nature of the neoplastic mass, and because of the negative observations in adjacent tissues and in the lymphatic glands that drained this region, it was considered probable that this neoplastic mass was benign in nature, and the prognosis of surgical elimination was favorable.

Roentgenographic Examination—Before operation roentgenograms were taken of the maxillary arch. These disclosed a marked physiologic alveolar resorption of the entire alveolar ridge, but the structure of the underlying bone showed normal density and texture. No broken tooth roots were found *in situ*, nor were residual areas of bone translucency found.

First Operation—January 12, 1932, the first step of the operation was done under procaine epinephrine block anethesia. An incision was made for the full depth of the mucoperiosteum, well beyond the border of the tumor into what appeared to be normal healthy tissue. Included in the incised area was the fold of hyperplastic tissue situated along the labio-alveolar sulcus (Fig. 2). All tissue included within this area of incision was resected by elevating the periosteum from the bone and was removed en masse as shown in Fig. 3. At this time a thin area of cortical bone was removed with a sharp broad bone chisel directly under the region below the neoplastic mass.

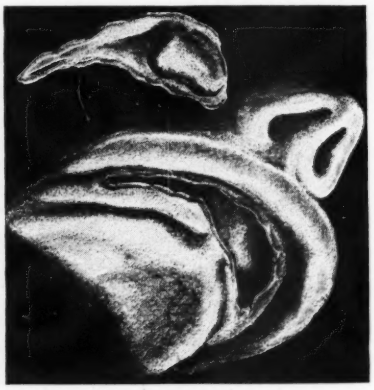


Fig. 3—Removal of mass.

Because of the fact that there was lacking sufficient soft tissue to make a closure of the wound, it was decided to make this a two-step operation. Removal of the neoplasm and labio-alveolar sulcus hyperplastic tissue was done at the first operation. The removal of the hyperplastic tissue fold on the alveolar ridge was done at the subsequent operation. On removal of the first resected area the mucoperiosteum of the palate was elevated for a centimeter or two beyond the line of incision; the tissues were stretched and sutured with interrupted catgut sutures (Fig. 4). All resected tissue was immediately sent to the laboratory for section examination and identification.

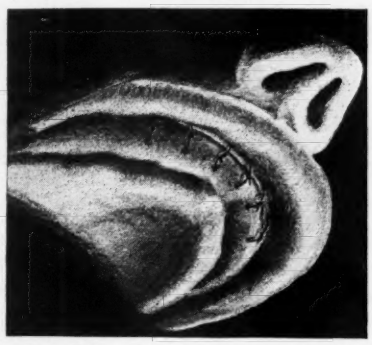


Fig. 4—Tissues stretched and sutured with interrupted catgut sutures.

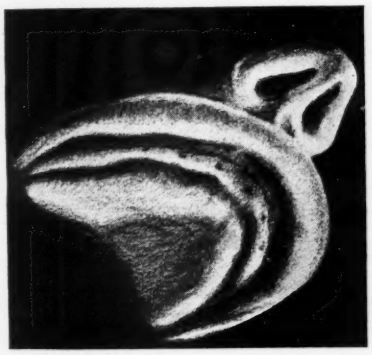


Fig. 5—Scar tissue at line of union.

January 17, 1932, the sutures that had not been absorbed were removed and the wound was found to have united by primary intention; there was only a small line of scar tissue at the line of union (Fig. 5).

Laboratory Report—At this time the report of the tissue section and examination was received from the laboratory. The specimen consisted of a piece of tissue covered by thickened epithelium 2.5 by 1 by 0.5 cm. The growth consisted of a dense perivascular plasma and round-cell infiltration of the dermis with ulceration of the epidermis. Marked subdermal, dense fibrous tissue with perhaps some giant cell infiltration was observed. A microscopic diagnosis of fibroma without evidence of malignancy was made (Fig. 6).

Second Operation—January 30, 1932, the second step of the operation was completed, again under procaine epinephrine, intraneural anesthesia. The hyperplastic tissue mass on the crest of the alveolar ridge was resected en masse as shown in Fig. 7. The incision was carried into what appeared to be normal healthy tissue and was of the full depth of the mucoperiosteum. The mucoperiosteum of the area adjacent to the line of incision was elevated and the wound sutured as shown in Fig. 8. Interrupted catgut sutures were used.

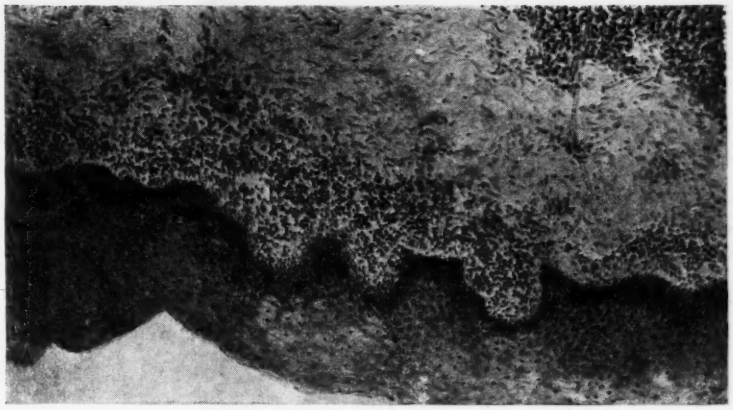


Fig. 6—Photomicrograph showing fibroma and giant cell infiltration.

Postoperative Course

Three weeks after the removal of the sutures of the second operation, impressions were taken for construction of a corrective maxillary denture. The maxillary arch at this time was in a satisfactory anatomic condition, without marked deformity as shown in Fig. 9. A corrective denture was made of vulcanite with a broad superior border, which would not have a tendency to cut into the soft tissues and which would in a measure mold and deepen the labio-alveolar and bucco-alveolar sulci. This denture was worn with complete comfort and functional satisfaction by the patient for six months, at the end of which time a satisfactory "permanent" denture was made. The patient has reported for examination regularly every four months since the second step of the operation was done. No tendency to recurrence of the tumor or hyperplastic overgrowth has been noted, and the soft tissues and underlying bone seem to be in a normal physiologic state with complete tolerance of the vulcanite denture.

Conclusions

1. Marked degenerative changes and soft tissue overgrowths often seem to be the result of mechanical traumatism and abrasion by poorly adapted oral prosthetic restorations.

2. These abnormalities and soft tissue overgrowths are generally believed to have potentialities for malignant degeneration.

3. It is obviously impossible to construct satisfactory prosthetic appliances upon abused and pathologic soft tissues, such as in the case reported here.

4. A carefully prepared case history and the intelligent use of laboratory information is necessary in making a rational diagnosis; the operative

(*Continued on page* 116)

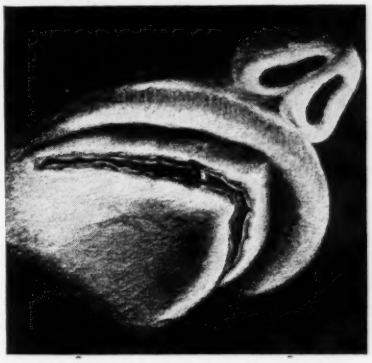


Fig. 7—Resected hyperplastic tissue mass (second operation).

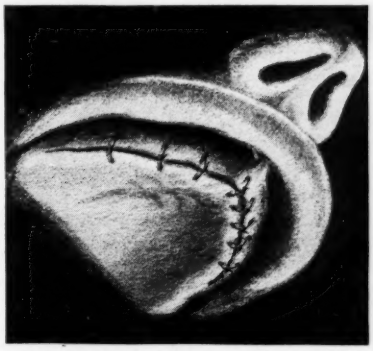


Fig. 8—Wound sutured (second operation.)

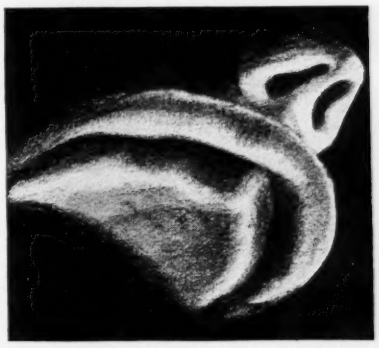


Fig. 9—Postoperative condition of maxillary arch (three weeks after second operation).

A PROPOSED POSTGRADUATE COURSE IN ORAL SURGERY

JOSEPH E. SCHAEFER, D.D.S., M.D.
Chicago

THE Cook County Graduate School of Dentistry is affiliated with the Cook County Graduate School of Medicine. The latter school has been in operation for several years and has as its faculty the attending staff of the Cook County Hospital. This staff is composed of men of outstanding ability in both surgery and medicine in the city of Chicago.

The Cook County Graduate School of Dentistry, through its attending staff, wishes to make available to the dental profession for study and observation the vast amount of clinical material of the Cook County Hospital.

If dentistry is to assume a higher professional status, it should have full responsibility for the care of the mouth. This includes not only the care of the teeth and their supporting structures, but the care of all lesions of the soft tissue, the various forms of stomatitis of both local and systemic origin, the mouth lesions of generalized skin diseases, the recognition of carcinoma and other malignancies, the severe infections of mouth origin, whether they are ascending or descending in character. This training should be broad enough to qualify the dentist fully to determine when the care of the patient falls within his province or should be referred to someone specially qualified to institute proper treatment. There are certain mutual interests existing between dentistry and medicine which call for correlated effort.

Diet

The exact rôle that diet plays in the prevention and control of dental caries has not yet been scientifically determined. There is a strong belief, however, that during the period of tooth development, which would include the prenatal period, infancy, and early childhood, up to the time when all the teeth are fully formed, diet is an important factor. Certain essential minerals and vitamins must be supplied in adequate amounts during these periods.

The proper knowledge of dietetics is particularly important to the dentist specializing in children's dentistry and to the orthodontist and those dentists in general practice who take care of children. Courses in dietetics as well as related courses in pediatrics can be arranged for at the Cook County Graduate School of Dentistry.

Nose and Throat

The dentist should be more broadly informed in the clinical field of the nose and throat. Many times by accident the maxillary sinus is opened into in the extraction of an upper tooth, or a root fragment is forced into the sinus. This immediately calls for some knowledge of the proper surgical management of this cavity. In many cases the maxillary sinus becomes directly infected through tooth origin; again proper diagnosis, which includes transillumination, roentgenologic observations, and intranasal inspection becomes important, while the treatment calls for careful consideration of the best method of surgical approach to such an infected sinus.

There are numerous cases of postoperative infection following the mandibular injection for block anesthesia, which develop into peritonsillar and neck abscesses. These are explained on the basis of the lighting up of a subacute tonsillar infection. A careful inspection of the tonsillar region might have shown the inadvisability of such an injection at the particular time.

Certainly there is no branch of medical practice more closely related to the practice of dentistry than that of the nose and throat. The dentist receiving clinical training in the principles of nose and throat practice will find himself in a much better position for consultation and cooperation with the nose and throat specialist.

Anatomy

A knowledge of anatomy is a necessary basic training to good surgery and thorough diagnosis. The knowledge of anatomy essential to the well trained dentist can only be acquired by repeated dissection of the head and the neck.

A hard localized swelling in the submaxillary triangle from a diagnostic point of view must be immediately differentiated between an involvement of the lymphatic glands or an inflammatory process in the submaxillary salivary gland system. This can be determined by bimanual palpation with a thorough knowledge of the contents of the submaxillary triangle.

The question of referred pain can only be analyzed by a thorough knowledge of the nerve distribution and nerve associations. Any surgical intervention in the floor of the mouth or about the maxillae calls for a knowledge of the anatomy of the parts. A complete dissection of the head and the neck will be given in which each student does his own dissection.

Block anesthesia of the various divisions of the fifth nerve, both deep and superficial, will be demonstrated on the cadaver by dye injections. Each student who has seen the various approaches to these nerves demonstrated will have the opportunity of dissecting the area injected with the dye in order to study the practicability of the particular approach.

Oral Surgery

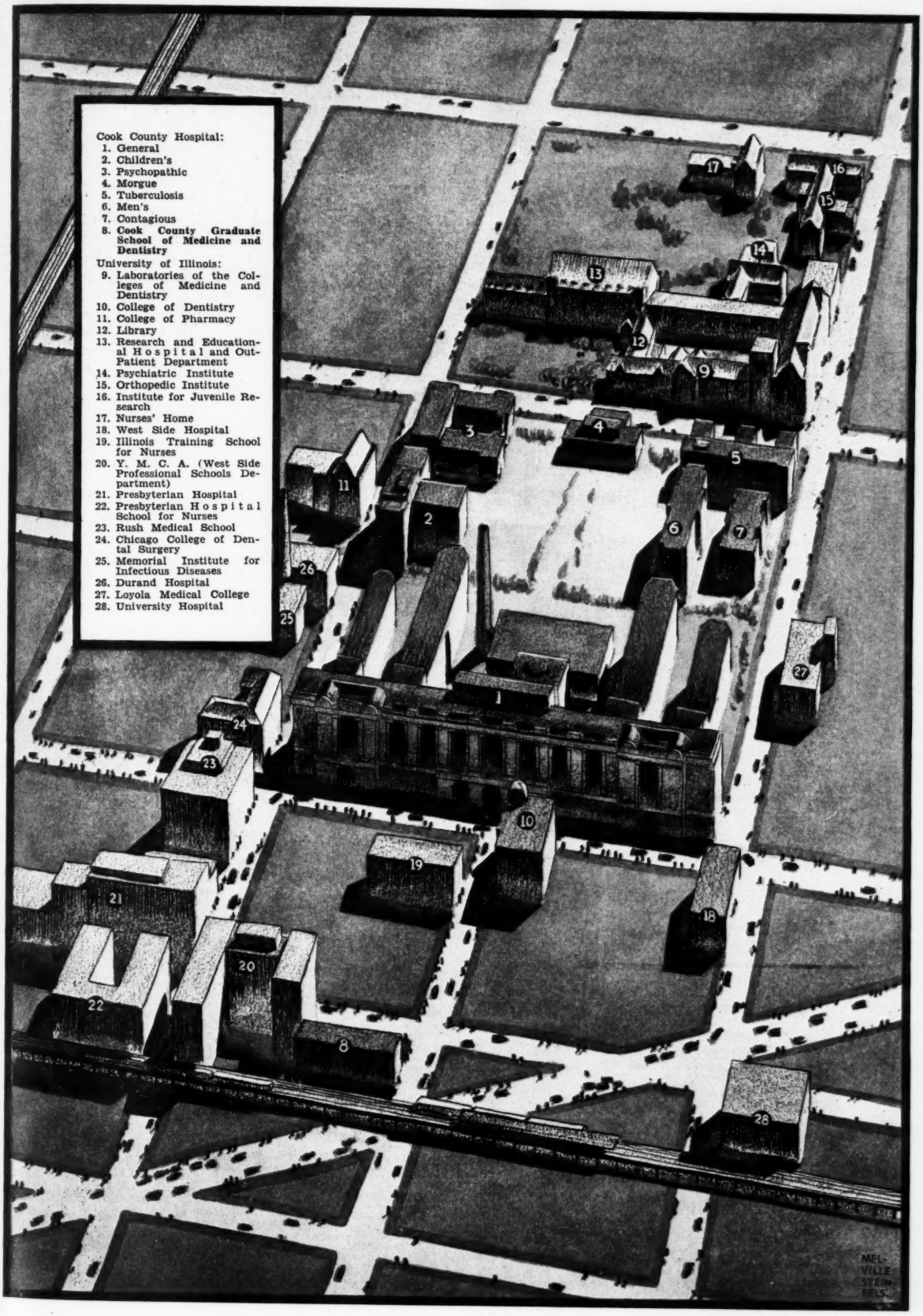
Any intervention in the mouth which breaks the continuity of the soft tissues leads the dentist directly into the surgical field. Oral surgery, whether minor or major in character, calls for the full understanding of correct surgical procedures and a proper understanding of the principles of general surgery. In this field the Cook County Graduate School of Dentistry has much to offer.

Focal Infection

As the principle of focal infection has been accepted in the practice of medicine, the proper understanding of the underlying principles of this type of infection in relation to systemic disease becomes of vital importance to the dentist who is to advise and consult with the internist and the surgeon in those problems recognized as having their origin in (or are related to) retained foci, such as myocardial disease, gastric and duodenal ulcer, toxic thyroidism, iritis.

The Cook County Graduate School of Dentistry will afford facilities to the dental profession in both the medical and surgical clinics dealing with these problems.

It is our plan to offer a five week diagnostic course in oral surgery.


Cook County Hospital:
1. General
2. Children's
3. Psychopathic
4. Morgue
5. Tuberculosis
6. Men's
7. Contagious
8. Cook County Graduate School of Medicine and Dentistry
University of Illinois:
9. Laboratories of the Colleges of Medicine and Dentistry
10. College of Dentistry
11. College of Pharmacy
12. Library
13. Research and Educational Hospital and Out-Patient Department
14. Psychiatric Institute
15. Orthopedic Institute
16. Institute for Juvenile Research
17. Nurses' Home
18. West Side Hospital
19. Illinois Training School for Nurses
20. Y. M. C. A. (West Side Professional Schools Department)
21. Presbyterian Hospital
22. Presbyterian Hospital School for Nurses
23. Rush Medical School
24. Chicago College of Dental Surgery
25. Memorial Institute for Infectious Diseases
26. Durand Hospital
27. Loyola Medical College
28. University Hospital
MEL-VILLE STEIN-BELS.

This work will be presented through lectures, clinics, and laboratory demonstrations. Twenty-five half-day periods will be devoted to diagnostic and surgical problems about the mouth.

I. Surgical Anatomy

(*J. L. Spivack and Associates*)

First Week

Period 1. Examination of the Exterior of the Skull:
a. Norma verticalis
b. Norma frontalis
c. Norma occipitalis
(*Lecture and demonstration*)

Period 2. Examination of the Exterior of the Skull (Continued):
d. Norma basalis
e. Norma lateralis
(*Lecture and demonstration*)

Period 3. Cranial Cavity:
Roof of cranial cavity; floor of cranial cavity; description of different cranial fossa.
Description of individual cranial and facial bones and particularly of the maxilla and mandible.
(*Lecture and demonstration*)

Period 4. Continuation of Lecture 3. Cervical Vertebrae.
(*Lecture and demonstration*)

Second Week

Period 5. Joints and Ligaments Pertaining to Head and Neck.
(*Lecture and demonstration*)

Period 6. Dissection of the Neck. Triangles.
Posterior triangle; its subdivision and contents.

Period 7. Dissection of the Neck. Anterior triangle; its subdivision and contents.

Period 8. Anterior triangle; its subdivision and contents (continued).

Third Week

Period 9. Dissection of Superficial Structures of the Face and of the Frontal Region.

Period 10. Parotid Region. Temporal and Infratemporal region.

Period 11. Temporal and Infratemporal Region (continued).

Period 12. Submaxillary region.

Fourth Week

Period 13. Submaxillary Region (continued).

Period 14. Review of the Fascial Planes, Great Vessels, and Nerves of the Neck.

Period 15. Great Vessels and Nerves of the Neck (continued).

Period 16. Mouth:
Review of the floor, walls, and the roof of the mouth.

Fifth Week

Period 17. Pharynx.

Period 18. Demonstration of the Maxillary Nerve, Mandibular Nerve, and their subdivision.

Period 19. Sphenopalatine Ganglion. Demonstration of Anterior, Middle, and Posterior Palatine Nerves. Termination of Internal Maxillary Artery.

Period 20. Tongue.

II. Oral Surgery

(*W. H. G. Logan, Joseph E. Schaefer, and Associates*)

Period 1. Discussion and Clinical Demonstrations of Inflammation.
a. Inflammation discussed on the basis of a biologic defensive mechanism; a cellular and vascular response to injury, whether the injury is on a traumatic, chemical, or bacteriologic basis.
b. Clinical demonstration.
Traumatic inflammation.
Infectious inflammation.
c. Differential diagnosis on the basis of systemic reactions, such as fever, malaise, leukocytosis with changes in cardiac and respiratory rates.

Period 2. Discussion of Cellulitis: Cellulitis of Mouth Origin.
a. Surgical Management: Discussion of the importance of nonsurgical intervention until the biologic defenses have succeeded in localization. Discussion of general and local management of the patient:
b. General Management: rest; pushing fluids; alkalinization.
c. Local Management: Physiotherapy. Discussion of the influence of heat, cold, and roentgen therapy in directing the course of this type of inflammatory reaction.
d. Surgical Intervention: Indication of the proper time for and type of surgical intervention.

Period 3. Continuation of Discussion of Cellulitis:
a. Ascending type of cellulitis leading to cavernous sinus thrombosis, meningitis, and death.
b. Descending type (Ludwig's Angina) leading to mediastinitis, cardiac and lung involvement with death of the patient.
c. Generalized extension of infection of mouth origin into the blood stream: septicemia and pyemia, with a discussion of diagnostic methods to establish proper diagnosis.

Period 4. Discussion of Bone Involvement:
a. Inflammation of Bone: rarefying osteitis; condensing osteitis; osteomyelitis.
b. Discussion of the bone problems must be thoroughly clarified if proper interpretation of bone changes as revealed by the roentgenogram is to be intelligently done.
c. Clinical demonstration of the various types of bone lesions with roentgenologic observations will be given.

Period 5. Discussion of Osteomyelitis:
Management of cases of osteomyelitis. There is no more important problem in oral surgery than the proper care of a bone infection associated with tooth involvement, if the patient is to recover without hopeless deformities and loss of function.

Period 6. Discussion of Focal Infections:
a. Focal infection of mouth origin. The problem has both a surgical and medical aspect. It involves the question of surgical eradication of suspected foci in systemic disturbances which fall under the medical explanation of secondary types of infection, having their origin in primary sites.
b. Roentgenograms of the teeth and diagnostic principles will be thoroughly discussed.

Period 7. Discussion of Precancerous and Cancerous Lesions: leukoplakia; papilloma; fibroma; fissures; all types of lesions associated with the possibility of chronic irritation.
a. There is a vast amount of material at the County Hospital of this type. As recognition of carcinoma in the mouth is one of the obligations of the dentist to society; he should be amply trained in the recognition of these lesions so that he will not confuse temporary inflammatory change with malignancies.
b. Discussion of the importance of the Wassermann reaction and biopsy examination of all chronic lesions of the mouth.
c. Clinical demonstration of the treatment of carcinoma of the mouth: radium and radon implantation; electro coagulation; actual cautery; surgery.

Period 8. a. Discussion of Fractures of the Mandible and Maxilla.
b. Clinical demonstration of fractures of the mandible and maxilla:
c. Diagnosis and Treatment:
Various types of wiring, splints; management of complicated fractures: comminuted, infected.

Period 9. Discussion of the Maxillary Sinus:
Clinical demonstration of involvement of the maxillary sinus associated with oral surgical problems:

Root forced into maxillary sinus; breaking through floor of maxillary sinus; permanent fistula leading into maxillary sinus from the mouth.

Period 10. Discussion of Major and Minor Tics:

Pain about the jaws and face as described by the patient may be one of the most difficult problems to analyze in the entire field of dentistry. This calls for the most careful appraisal of the subjective symptoms, as told by the patient, in relation to the known types of diseases.

a. *Major tics* must be carefully differentiated from all other pains. This calls for a thorough knowledge of the classical symptoms and observations of tic douloureux.

b. *Minor tics* call for a most careful search of objective manifestations, a careful inspection of all teeth, both by roentgenographic and clinical examination, for hidden caries, pulp stones, chronically inflamed pulps, and bone lesions of the jaw.

c. The maxillary sinus and auditory canals must also be included in this inspection if all objective observations are to be evaluated.

III. Major Oral Surgery Clinics

These clinics will include the following types of operations:

a. Temporomandibular arthroplasty.

b. Plastic repair of congenital harelip and cleft palate.

c. Excision of carcinoma of lip with plastic repair.

d. Radon implantation to control carcinoma of lip, tongue, cheek, and floor of the mouth.

e. Neck resections in cases of carcinoma of mouth.

f. Extensive plastic repairs of the face following defects in the control of cancer of the mouth.

g. Bone and Retention Cysts.

h. Oral Surgery Clinic: Observe preoperative and postoperative treatment of the severe infections of both the soft and hard tissues. Fractures of the mandible and maxilla will be demonstrated. All other postoperative cases.

IV. Course in Hematology

(*R. H. Jaffe and Associates*)

The course consists of five sessions of two hours' duration. In each session, one hour is devoted to lecture, while one hour is spent in practical demonstration of blood films, microscopic sections, and gross specimens. After a general introduction dealing with the normal blood formation and the normal blood picture, the different diseases of the blood are considered, special stress being laid on the changes in the oral cavity.

Period 1. The Normal Blood.

Period 2. Normal and Pathologic Blood Formation.

Period 3. Anemias.

Period 4. The Reaction of the Blood in Infectious Agranulocytosis and Related Conditions.

Period 5. Leukemias.

V. Skin and Syphilis Clinics

(*M. S. Wien and Associates*)

a. Discussion of Diseases of the Lips and Mucous Membranes of the Buccal Cavity.

The vermillion of the lips, the tongue, and the mucous membranes of the mouth are frequently involved conjointly with generalized cutaneous eruptions, chief among which are: erythema multiforme, pemphigus, dermatitis herpetiformis, acute exanthemas, lupus erythematosus, and lichen planus. These conditions are for the most part of constitutional origin, and reveal the rôle of the mouth cavity in association with the skin, in the surface expression of visceral disease.

b. *Syphilis* in all its stages involves the lips and mouth cavity and every structure in these areas may be involved in any stage of the disease. These varied manifestations are discussed and their rôle stressed from the standpoint of contagion, differential diagnosis, and confusion with malignancy.

c. *Fungi* and *Bacteria* may produce a characteristic picture in the mouth cavity, e.g., thrush actinomycosis, Vincent's infection, pneumococcus, diphtheria, tuberculosis.

d. Neoplasms of ulcerative and nonulcerative character; the importance of distinguishing clinically between benign and malignant lesions is stressed. Discussion of laboratory aspects of diagnosis.

e. Ulcerations: traumatic; specific; nonspecific.

f. Precancerous lesions of the lips and mouth cavity and the clinical identification and differentation thereof are important. Discussion of such conditions as leukoplakia, syphilis and its rôle in malignancy, papilloma of tongue.

g. Galvanic lesions of the mouth and the rôle of dentures in their production are discussed.

VI. Nose and Throat Clinics

(*S. J. Pearlman and Associates*)

a. Anatomy of Nose: Walls, Roof, Floor.

(1) Number and location of accessory sinuses.

(2) Points of drainage into the nose.

b. Physiology of Nose:

(1) To Warm Air by virtue of "swell bodies."

(2) To Moisten by virtue of mucous membrane.

c. Anterior Rhinoscopy:

(1) What is seen?

(2) Septum, condition of.

(3) Relation of turbinate bodies to septum.

(4) Color and texture of mucous membranes.

(5) Character of secretion.

(6) Abnormal growths.

(7) Bleeding areas.

d. Common Diseased Conditions in the Nose:

(1) Acute Rhinitis.

(2) Chronic Rhinitis.

(a) Hypertrophic.

(b) Atrophic

(c) Vasomotor.

e. Posterior Rhinoscopy:

(1) Nasopharynx:

(a) Anatomy of

(b) Adenoid vegetation

(c) Relation to middle ear disease.

f. Oral Pharynx:

(1) Significance of its inspection.

(2) Acute and chronic tonsillitis; peritonsillar abscesses.

(3) Indications for tonsillectomy.

g. Maxillary Sinus:

(1) Anatomy of

(2) Disease of

(3) Surgical management.

VII. Medical Clinics

(*Aaron Arkin and Associates*)

1. The Nature of Infectious Diseases:

a Every infectious disease is a condition of parasitism: the human body, the host; the germ, the parasite.

b. Paths of entrance of pathogenic bacteria in infectious diseases: upper respiratory tract, gastro-intestinal tract, skin, genitalia.

c. Immunity and susceptibility: hereditary, acquired active, acquired passive immunity.

d. The conquest of the communicable diseases: hygiene, sanitation, quarantine, immunization, purification of water and milk, insect transmission.

2. Focal Infections and Systemic Disease:

a. The most common foci are: teeth, tonsils, mastoids, sinuses, pulmonary suppurations, gallbladder, appendix, genito-urinary tract, intestinal tract.

(Diagnosis, bacteriology, treatment.)

b. Diseases frequently secondary to focal infections: acute rheumatic

fever, eye infections, osteomyelitis, infectious arthritis (streptococcus, gonococcus, syphilitic, tuberculous), peripheral neuritis, septicemia.

3. Septicemias:
   a. Primary focus in a fixed tissue.
   b. Blood observations, bacteriologic studies.
   c. Immunologic factors lowering resistance.
   d. Symptoms, clinical types.
   e. Metastatic foci, pyemia.
   f. Therapy.
4. Blood Dyscrasias:
   Clinical symptoms of the important blood dyscrasias of interest to the doctor of dental surgery: acute leukemias, chronic leukemias, pernicious anemia, aplastic anemia, agranulocytosis.
5. Systemic Diseases of Special Importance in Dentistry:
   a. Scurvy, an avitaminosis.
   b. Hyperparathyroidism, osteitis cystica, osteitis fibrosa.
   c. Lipoid granulomatosis. Hand-Schuller - Christian syndrome and its relation to the teeth.
   d. Congenital and acquired syphilis.
   e. Acromegaly, hyperpituitarism.

VIII. Surgical Clinics

(*Karl A. Meyer and Associates*)

1. Discussion of the physical condition of the patient (preoperative):
   a. With the purpose of defining the condition of the cardiovascular system in relation to the shock incidental to surgery.
   b. With the purpose of defining the condition of the pulmonary apparatus in relation to the type of choice of anesthesia.
   c. The relation of foci of infection and their bearing to postoperative complications.
   (*Major surgical demonstration*)
2. Discussion of preoperative medication:
   a. Aseptic technique employed in the modern operating room.
   b. Importance of asepsis in general as applied to major surgical procedures.
   (*Major surgical demonstration*)
3. Discussion of surgical shock and hemorrhage during the major surgical procedures.
   a. Importance of preparation for treatment of shock and hemorrhage by blood transfusions and intravenous injections of fluids.
   b. Discussion of care of the mouth, postoperative, to avoid parotitis and pulmonary complications.
   c. Postoperative care and medication.
   (*Major surgical demonstration*)
4. Discussion of oral foci of infection in relation to gastric and duodenal ulcer: duodenitis and gastrojejunal ulcer.
   Importance of their eradication as a procedure incidental to cause and prevention.
   (*Major surgical demonstration*)
5. Discussion of thyroid, of renal and of bone and joint diseases in relation to oral foci of infection.
   (*Major surgical demonstration*)

IX. Eye Clinics

(*W. F. Moncreiff and Associates*)

1. Etiologic factors in the mouth, jaws, and adjacent tissues, producing disorders or diseases of the eyes, or disturbances of vision only:
   a. Nonseptic lesions, especially those exerting localized pressure, giving rise to reflex disturbances.
   b. Septic lesions (focal sepsis); namely, those of the walled in, nondraining type.
2. Eye disorders, with or without visual disturbance, which may be caused entirely or in part by factors noted:
   a. Asthenopic syndromes, characterized by headache, painful near work, vertigo, nausea, and a variety of other symptoms.
   b. Accommodative disorders; namely, paresis or spasm, of various grades of severity.
   c. Disturbances of mobility of the eyes.
3. Eye diseases, with or without visual disturbance, which may be caused entirely or in part by factors noted:
   a. External diseases, or disease of the anterior segment.
   Inflammatory processes of the lids, lacrimal sac, conjunctiva, episclera, and cornea.
   Inflammations of the anterior uvea; namely, iritis and iridocyclitis, are of especially marked importance.
   Cataract in its relation to focal sepsis.
   b. Fundus diseases, or diseases of the posterior segment; namely, vitreous, choroid, retina, and optic nerve.

Conference on Pathology

There is no better way for the dentist to get a cross-section view of disease and disease process than by attending conferences on pathology in which causes of death and the postmortem material are carefully reviewed. The Cook County Hospital department of pathology is headed by one of the ablest pathologists in this country.

Conclusion

The object of postgraduate work is to review the basic principles of medicine and surgery; to acquire a broader comprehension of the application of these principles to the treatment of disease, and to stimulate the mind to reach out for greater individual achivement. The five week course, as outlined, aims in a measure to accomplish these purposes. It is hoped that once the desire has again been aroused for a greater self-development, dentists will continue to return for more work.

It is also understood that a five week period may entail a considerable loss economically to a busy practitioner; our work, therefore, will be so arranged that courses can be adjusted to meet the dentist's particular needs. The work as outlined can be spread over a longer period of time, particularly for those practitioners who live in Chicago and its environs.

The courses given to the dental profession will be planned and coordinated through its Oral Surgery Department. Further information can be had by writing to the Cook County Graduate School of Medicine, 427 South Honore Street, Chicago.

55 East Washington Street.

SURGICAL RESECTION OF A BENIGN NEOPLASM

(*Continued from page* 111)

procedures indicated are often simple applications of the generally accepted routine of minor oral surgery.

5. In all cases in which tissue resection is made and neoplastic growth is suggested, the tumor should be removed with sufficient normal tissue to carry the incision beyond the area of neoplastic involvement whenever possible; all tissues must be sectioned, identified, and a definite diagnosis established.

6. Simple plastic operative procedures are often necessary and desirable wherever there is abnormality or deformity of the tissues that are to support a prosthetic restoration.

25 East Washington Street.

ELECTROMEDICATION IN ROOT CANAL THERAPY

JOHN H. HOSPERS, M.A., D.D.S.
Chicago

THE use of the electric current in dentistry was brought to this country and popularized by Doctor M. L. Rhein in 1879. Since that time a great deal of valuable research has been done on this subject by Printz, Grossman, Appleton, and others. Doctor J. H. R. Schleycher[1] of Baarn, Holland, states:

An electric current creates heat in its conductor by transforming electric energy into caloric energy . . . The quality of energy thus liberated, according to Joules law, depends on (1) intensity of current; (2) the resistance of the conductor; (3) length and diameter of the same; (4) the working time.

An electric current divides salt solutions and the (*plus*)+ions wander to the positive pole and the (*minus*)—ions to the negative pole. The diathermic current is an alternating current of very high frequency. It possesses the property of changing electric energy into caloric energy, and does not irritate living tissue by electrolytically altering it. This method of applying heat to living tissue is different in principle from any other method.

Irradiation by sun or lamps or hot water, etc., will only result in surface hyperemia. These hyperemias will cause the blood to transport the heat immediately, and the deeper tissues do not react to the higher temperatures, so it may be regarded as a defense of nature. The body does not have any defense against electric currents; they deliberately pass the skin and membranes.

One must be sure that the contacts are secure, and the patient must be comfortable; a movement may loosen the contact. The current is increased in intensity until felt by the patient and then it is reduced to the point at which no pain is felt.

Elaborate tests were made by Doctor Schleycher as follows: (1) roentgenograms of the tooth; (2) opening of the root canal; (3) sterilization of the cavity and the surrounding tissues with iodine and hydrogen dioxide, 33 per cent; (4) sterilization of a Miller needle in a Flaherty sterilizer and insertion of needle into canal; (5) direct microscopic examination and inoculation on different culture mediums; (6) ionizing; (7) covering the tooth with sterile wadding; (8) anesthesia; (9) extraction of the tooth and immediately depositing it in a sterile petri dish; (10) in bacteriologic laboratory: (a) opening the tooth; (b) direct microscopic examination of the outside of

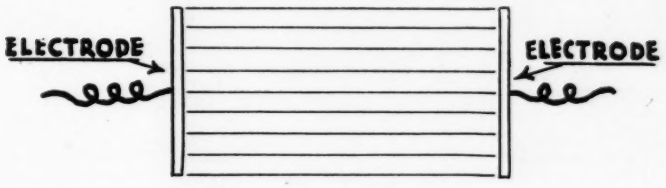


FIG. 1

Two electrodes, same size and tissue of homogeneous structure. Current distributed evenly and heating also.

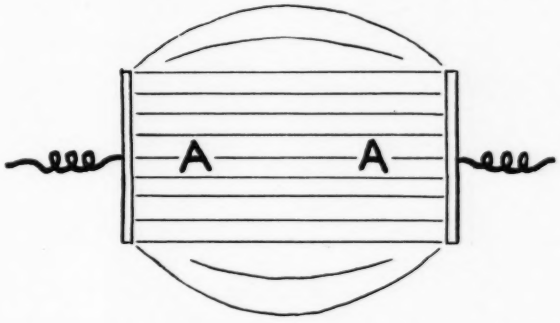


FIG. 2

Tissue greater dimension than the equal electrodes. Most heat at a-a.

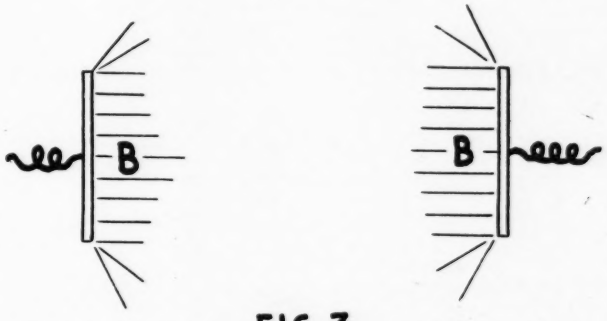


FIG. 3

Tissue so large that the current may take every possible way. There the heat will be found at b-b.

[1] Schleycher, J. H. R.: Diathermy in Dentistry, D. Cosmos 74:1-13 (January) 1932.

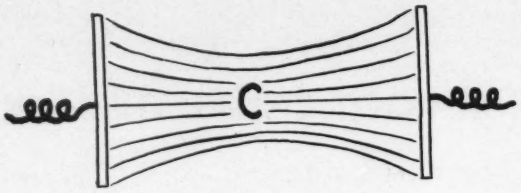


FIG. 4

Tissue is smallest between equal-sized electrodes. Current will concentrate and heat the tissue most at C.

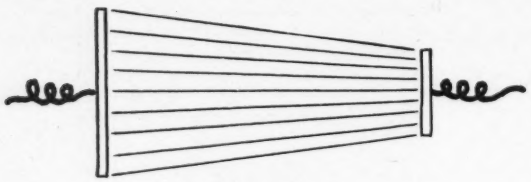


FIG. 5

Two electrodes of different sizes. Most heat will be at the smaller electrode.

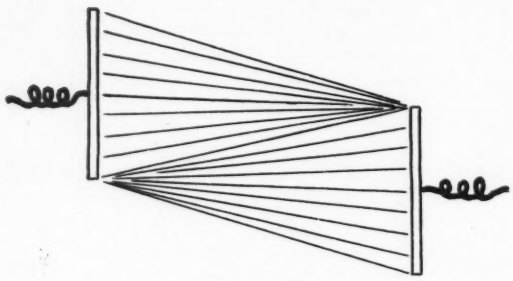


FIG. 6

Two electrodes of the same size, but not facing each other. Current takes the shortest way, and the rims nearest will have the most heat.

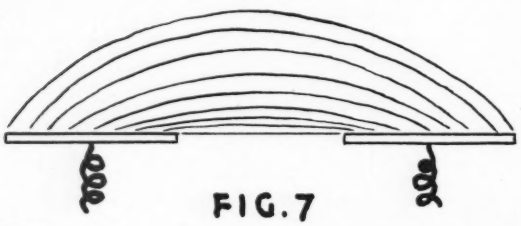


FIG. 7

Fig. 6 illustrated in another way.

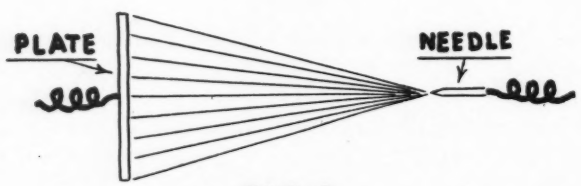


FIG. 8

Demonstrates how practically all the heat will be found at the smaller electrode.

the granuloma; the inside of the granuloma, and the inside of the canal; (c) inoculations on agar-agar; (11) cultures grown aerobically for three days.

Doctor Schleycher reported that the roentgenogram showed rather a large granuloma. The ionizing machine was connected and the current turned on until the patient indicated that the threshold of pain was reached. There the current was kept stationary for three seconds, and then switched off.

The exact value of the intensity of the current cannot be given. The patient alone can indicate when the threshold of pain has been reached. This means that the rim of the granuloma has been reached. The granuloma possesses no sensitive nerves; but the tissue immediately surrounding it possesses them in abundance. Thus burns are prevented. Doctor Schleycher says:

> The very remarkable result was that nothing grew on any of the cultures. This proves that surgical diathermy can sterilize periapical tissue and the contents of the root canal in a remarkably short time.

Further Review of Literature

Coolidge says, "Another method of obtaining nascent chlorine for treating root canals is the ionization of a 1 per cent solution of sodium chloride by means of the electric current."

Burchard and Inglis[2] say in regard to the method employed by Doctor Harry B. Johnston of Atlanta, Georgia:

> It consists of ionizing the parts with Churchills tincture of iodine, with a galvanic current of 0.5 milliampere for 30 milliampere minutes. By laboratory tests, ionizing roots and granuloma (upon freshly extracted teeth), the interior of the granuloma was proved infected before; and the entire granuloma and root interior sterile after ionization. Fluids aspirated from ionized apical areas in the mouth were proved sterile and the root filled immediately and several months later opened and aspirated and showed sterile apical areas and canals. Acute apical abscesses and chronic apical abscesses with or without fistulae, were rendered sterile and immediate root-filling was possible, with success and claimed to be desirable.

Johnston[2] reports that in 700 cases immediate stoppage of infection occurred in 95 per cent of the cases. He uses Churchills tincture of iodine; 3.3 Gm. of potassium iodide; 25 cc. of water; 16.5 Gm. iodine in 60 cc. of alcohol; alcohol as needed per hundred cubic centimeters.

If the iodine is used for ionizing, an iridio-platinum needle must be used as the electrode and attached to the negative pole of the machine. The electrode should be flat and the point carried as near as possible to the end of the root.

[2] Burchard and Inglis: Textbook, page 512.

Sturridge[3] recommends a positive zinc electrode and a 3 per cent solution of zinc chloride as an electrolyte.

Crane[4] prefers zinc chloride as an electrolyte with a positive platinum electrode.

Printz[5] recommends a positive platinum electrode and a 1 per cent sodium chloride solution as an electrolyte, which, being electromagnetic, forms at the positive pole.

I have been using a zinc electrode at the positive pole and a saturated solution of sodium chloride as an electrolyte.

The ionization period is governed by the pain response of the patient; the number of milliamperes of resistance is divided into 30 to determine the number of minutes of application. Sodium chloride is probably the oldest and most generally used solution. It depends for its sterilizing action on the liberation of chlorine. After a few minutes of ionization, generally a definite odor of nascent chlorine can be distinguished. The positive electrode must be used in the canal.

Grossman and Printz[6] after numerous tests for sterility between camphorated-monochlorophenol and electrosterilization found that the latter in conjunction with sodium chloride is more efficient than the method of sealing a medicament in the root canal of a tooth. Out of sixty patients equally divided, electrosterilization required fewer treatments with ionization and the treatment period was shorter.

Werther[7] says:

Occasionally it was to subject one of the cases that had persistently given positive cultures (in spite of more than the average number of treatments) to electrolytic therapy. The results, judged from the quickness with which the negative culture was secured were gratifying . . . .

Using the number of treatments needed to obtain a negative culture as an admittedly imperfect, but, at present an indispensible criterion of the relative values of two methods of treating periapical infection, (1) camphorated monochlorophenol topically applied, and (2) electrolytic therapy with a zinc iodide solution, we reach the conclusion that the second method is preferable. Cases which had repeatedly given positive cultures, rapidly gave negative cultures, after the use of electric therapy.

Further, Werther says, "Such roentgenographic evidence as we have on hand indicates that normal bone regeneration does occur in a satisfactory manner after electric therapy:"

Statistics compiled by a person

[3] Sturridge, Ernest: Electro-Dental Therapeutics (textbook).

[4] Burchard and Inglis: Footnote 2, page 514.

[5] Printz, Herman: D. Cosmos, April, 1917.

[6] Grossman, L. I. and Printz, Herman: Comparative Study of Root Canal Therapy, D. Cosmos, 74:324 (April) 1932.

[7] Werther, Raymond: Observations on the Use of Electrolytic Therapy, D. Cosmos, 74:328 (April) 1932.

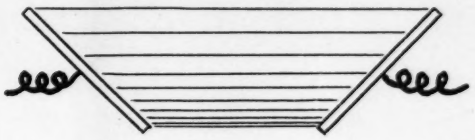


FIG. 9

Shows the path of the current when the two equal-sized electrodes are in an oblique position.

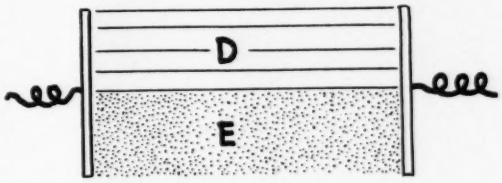


FIG. 10

Supposes a conductor with partly low and partly high resistances. It is obvious that the current will take the easiest way and therefore pass through the conductor with low resistance. The result will be that only in this tissue will heat be developed when the two electrodes cover both tissues.

Here the current is forced to pass the tissue with low resistance as well as the tissue with high resistance. It will be clear that now the tissue of higher resistance will receive the greater quantity of heat.

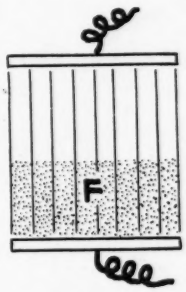


FIG. 11

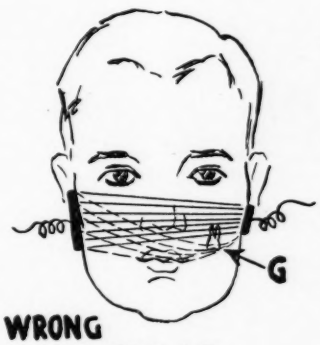


FIG. 12

When the healing of the periapical part is desired. The smaller of the electrodes is placed as near the spot as possible; the larger one, on the opposite side of the head. It is difficult to control the current thus. This is a primitive method; p, indicates the course the current should NOT take.

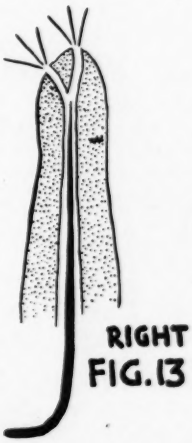
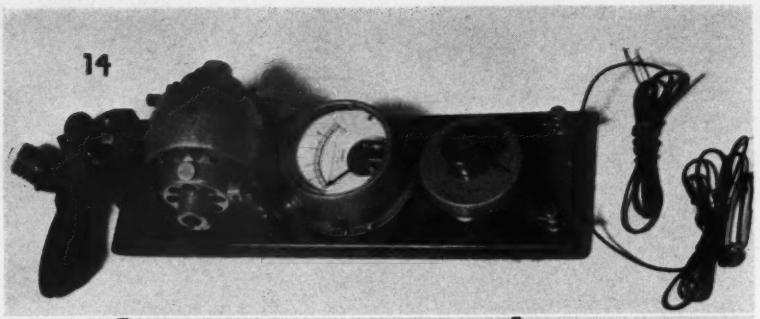


FIG. 13

With the electrode in the root canal as near as possible to the root-end. It is the nature of the current to follow the way of least resistance, and therefore, it will follow the root canal and its ramifications. The ramifying openings to the canals which are most difficult to reach will be reached first with the diathermic current.



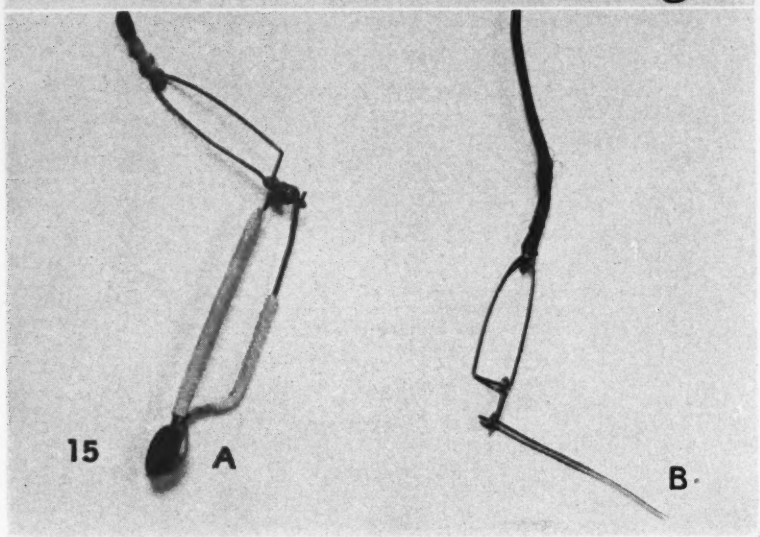


Fig. 14—Portable Ionizing Machine. The cheek electrode should be attached to the other wire.
Fig. 15—A, Cheek electrode attached to negative pole. B, Pure zinc wire. Positive electrode tube placed in the root canal.

working alone may be in error; but when isolated investigators come to the same conclusions reached by a group of investigators, who have followed a definite routine, then the statistics can be trusted.

Advantages

The advantages of ionic medication in dentistry are many: (1) it is easily carried out; (2) it is positive; (3) it is not so painful as many other operations; (4) there are no ill effects; (5) any discomfort caused at the time of administration disappears as soon as the current is turned off; (6) improvement is noticed at once and is unmistakable by both patient and operator; (7) it places at our disposal a method of applying antiseptics, sedatives, stimulants, or styptics to a local area, which act in concentration on the part medicated.

The therapeutic effects of the ions on the oral tissues are to my mind of such importance that it should take the place of the present method of treatment in nearly every form of septic infection of the periodontal membrane.

Sturridge points out:

> There are a few disturbing factors that are puzzling and sometimes alarming to the patient; but they are easily controlled. There is sometimes a slight stimulating action of the current on the optic nerve through its connection with the dental nerves. Sometimes tiny flashes of light are noticed by the patient (this may be due to a slight break in the contact or a sudden touching of the electrode on a metallic filling in the tooth) . . . But I have good cause to be satisfied with results obtained with ionic medication, especially in the treatment of pyorrhea.

Operation of Equipment

The complete ionization equipment consists of a small generator on a base about 4 inches by 14 inches long.

1. The gradual application of the current is accomplished by a regulator button on a small rheostat which controls an indicator needle on the milliampere meter.

The milliampere meter will register the amount of current flowing, if the polarity is correct. If the polarity is wrong the needle will move to the left, away from the scale, instead of moving over it. The red cord is the positive and the green, the negative. Care must be taken to connect the plug to the machine with the right polarity or the current will be reversed. This can be tested by placing the moistened fingers in contact with the two terminal buttons, being sure that the regulator button is turned to zero. Then move the regulator button until the meter shows the current. If the needle moves over the scale, that is, to the right, the connection is correct.

2. The portable instrument is plugged into an electric light socket, the light switch acting as the regulator starting switch.

3. The graduated dial does not give a reading in volts; but it is simply an arbitrary scale for the intelligent use of the instrument.

4. There is positively no danger from shock. The motor transformer reduces the main line current voltage from 110 or 220 volts to about 40 volts which is enough for ionizing.

Electrodes

There must be two electrodes in order to have a closed circuit through the body. The positive electrode may consist of zinc, copper, or platinum; but there is an advantage in using an electrode of the same metal as that in solution in the electrolyte. The zinc or copper needle-like electrodes are made to fit better into the canals; but it is better to use the largest possible size, so as to reduce the current density per given area. The end of the needle should be as far up into the canal as possible.

The spring cheek electrode must be clamped around the cheek with the metal disc as close to the tooth as possible. It is considered the most efficient for dental service. Only chemically pure zinc may be used since other zincs are likely to contain arsenic and antimony; if it does, serious results are sure to follow its use. The negative electrode may be wrapped in cotton and moistened in water.

Root Canals

The root canal should be chemically and mechanically cleaned. The chemical cleaning may not be so essential, because the ionization will take care of that; but the mechanical cleaning is important, because it is impossible to fill a canal that has not been thoroughly opened; however, it has been my practice to open and sterilize the canal chemically, in addition to ionization. The rubber dam should be in place on the tooth to insulate it; otherwise, there may be leakage of the current and the ionizing will not be effective.

If zinc chloride is used as the electrolyte, the canal must be perfectly

Fig. 16A

Fig. 16B

Fig. 16C

Fig. 16D

(Case 1)—A, Lower first bicuspid. A large rarefied area involving the entire lower third of the root. Treatment started March 12, 1929. Callahan method followed by ionization; sodium chloride used as the electrolyte, at the second sitting, after which the canal was filled immediately. B, Roentgenogram taken March 16. The unfilled canal shows the necessity of a follow-up picture. C, shows the refilled canal with a bifurcated opening both filled to the end. The rarefied condition still shows plainly. D, Taken January 7, 1931, about a year and a half later, shows the disappearance of the involvement.

(Case 2)—A, A large area involving the apex of the upper right lateral. Treatment started July 28, 1930. Same method of treatment as in Case 1. B, Root canal ionized and filled August 1, as shown with a slight overfilling. C, shows the condition on January 28, 1931, less than six months after treatment. The overfilling has not interfered with the healing process.

Fig. 17A

Fig. 17B

Fig. 17C

Fig. 18A

Fig. 18B

Fig. 18B

Fig. 18C

(Case 3) A, B, C—Large cystic area involving lower right lateral, right and left centrals. Draining from two fistulae. Experimental case with the consent of the patient. Right lateral and left central; both pulps vital. Right central putrescent. Procaine hydrochloride block anesthesia used. Removed vital pulps; ionized canals, and filled by Callahan technique. Opened and treated and ionized canal in right central at the same time. Ionized this canal at the next sitting and filled the canal. Roentgenograms show the progressive improvement.

dry before the zinc chloride is applied. If sodium chloride which is an aqueous solution is used as the electrolyte, the canal is not dried. I do not approve of the electric root canal drier. I believe that it is harmful to the tooth structure and interferes with the thorough filling of the root canal especially when the "diffusion technique" is used.

The positive electrode is placed in the canal if zinc chloride or sodium chloride is used as the electrolyte; but if an iodine solution is used, the negative electrode is placed in the canal inasmuch as that is an electronegative electrolyte.

The sodium chloride electrolyte is boiled in a small dissolving dish before it is put into the canal. Then it may be applied with a small dropper or pliers and worked into the canal with a small file until it is flooded.

Care must be taken not to use too much electrolyte, because the surplus overflows the canal and cavity, and contacts the metal clamp, causing the current to follow the electrolyte rather than the electrode in the canal.

Ionizing

The cheek electrode wrapped in moisted cotton is applied and the wires from the machine are attached to their proper terminals. Then the current is turned on and the button on the rheostat is gradually turned until the patient indicates that pain is felt. When the threshold of pain is reached, it indicates that the current has penetrated to the outside rim of the granuloma. Reduce the flow of the current just short of this point, and divide the number of milliamperes indicated into 30; that will give the proper time, in minutes, to continue the ionizing.

Action of Current

The action of the ionizing current on the sodium chloride with the zinc electrode is to break it up into zinc chlorides which has the same antiseptic action beyond the root-end that the zinc chloride electrolyte would have; in addition, there is a weak

solution of sodium hydroxide that acts as a saponifying agent on any broken down proteid matter which might have been left in the canal. The canal is filled immediately, preferably by the modified Callahan technique.

Electrolytes

Grossman and Appleton[9] mention some of the possible solutions that can be used as electrolytes: "Sodium chloride, copper chloride, zinc chloride, magnesium chloride, copper sulfate, zinc sulfate, argyrol, aqueous and alcoholic solutions of iodine." M. L. Rhein, a pioneer in this field was an ardent advocate of the use of sodium chloride and the zinc electrode. W. D. Miller suggested the use of sodium chloride. Ziegler used sodium chloride.

[9] Grossman, L. I. and Appleton, J. L. T.: Experimental and Applied Studies in Electro-Sterilization, D. Cosmos, 73:147 (February) 1931.

25 E. Washington St.

Printz, after an exhaustive study on this subject, recommended sodium chloride. Grossman and Appleton tested more than fifty different solutions and they found that electrolysis does increase the antibacterial value of the electrolyte. In fact, it becomes twice as strong. Only the positive pole should be used in the root canal, because, depending on the chemical agent, the degree of bacterial destruction around the positive pole is several times greater than at the negative pole.

Grossman and Appleton's final selection of an electrolyte was zinc iodide because of its high antibacterial effect and low degree of irritation. It must be kept in glass or rubber-stoppered bottles, and must be kept away from metals. The antibacterial action is primarily due to the effect of the electrolyzed chemical solution and is strongly bactericidal.

A zinc electrode gives a greater antibacterial effect than an iridioplatinum electrode when the electrolyte used is sodium chloride. Theoretically it would seem better to ionize each canal separately. Clinically and experimentally, the results are just as good where two or more canals are treated at the same time.

Burchard and Inglis state:

> The pulp, then, being infected, in most cases and granuloma or some form of apical abscess often being present, the ideal treatment is one which shall at one sitting eliminate all canal and apical infection without setting up enough acute inflammation to render it inapplicable. If it permits the immediate filling of the root canal, so much the better.

Werther says that normal bone regeneration does take place after electrotherapy. This has also been my experience.

ABOUT OUR CONTRIBUTORS

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The Editor's Page

NO ONE spectacular theory or technique, such as that of focal infection or of the development of the gold inlay, which has been advanced since the turn of the century is as important as the change in point of view that the profession has adopted toward the biologic significance of dentistry. Dental disease, its causes and consequences, is no longer viewed as a special pathologic process totally different in character from other diseases that attack human tissue. Various and several forces have been in operation to hasten this awakening. Notable among these has been the improvement in the standards of dental education. At one time, not so long ago, dental colleges gave lip-service to the fundamental sciences, and dental college teachers of the basic subjects impressed on their students the idea that the sciences were taught primarily to meet state board requirements and could be forgotten ever-after.

Dental students were often made to feel by their teachers, particularly by doctors of philosophy and medicine, that they were a peculiar breed of students, incapable of comprehension and that they were entering a field of activity in which they needed only a nodding acquaintance with science, in which too much detailed knowledge was unnecessary and irrelevant. The day of this type of teaching, however, is happily ending, because dentists themselves have shown the world that dentistry is important. Moreover, critical students, effective deans, and an alert profession will not tolerate discriminatory educational methods or pedagogy of inferior quality.

The literature of the profession, the programs of dental meetings, and the conversation of dentists show the awakening. Not the least to appreciate the change has been the public. The public in large numbers is showing an enlarging appreciation of dentistry, its health significance, and its social value. This attitude casts a responsibility on the profession. We must enforce and are enforcing guarantees of adequately trained dentists to the public and are watchful of unethical methods in practice to help raise the qualitative level of practice.

There is a lag between our training in the basic science and its clinical application, about which many of us are conscious. Many of us definitely feel the need of that experience at first hand with the many practical aspects of disease which is to be had by an internship. Unfortunately, we usually recognize this need too late; sometimes years after we have been in practice. The postgraduate courses in our dental colleges do not offer us this larger kind of experience. Heretofore postgraduate instruction of practical value, wide in scope, has not been offered to practicing dentists under the auspices of a university or an important hospital. A few outstanding men, here and there, have given valuable courses, usually on a single subject in universities or hospitals, but broad coordinating clinical instruction and facilities for observation have not been offered.

In this issue Joseph E. Schaefer, D.D.S., M.D., of the oral surgery staff of the Cook County Hospital in Chicago, Illinois, describes a proposed plan of post-graduate instruction of a kind that has never been made available to dentists. This program of instruction is consistent with the newer attitude toward dental instruction; it is to be given by the members of the Cook County Graduate School of Medicine who are the members of the attending staff of the Cook County Hospital, and many of these men also hold chairs in the medical schools of Chicago.

When it is recalled that the Cook County Hospital with 3,300 beds is the largest hospital in the world and admits 73,086 patients each year, it will give interested dentists some idea of the amount of clinical material available for instruction to dentists in general medical and surgical methods as well as in oral diagnostic and surgical conditions.

A study of the proposed curriculum suggests that here is a definite and practical plan offered which has as an objective the vitalizing of the basic medical sciences in a manner that the dentist can use in his practice. This is not to be a course in the detached theory of medicine and surgery, but a clinical course for practicing dentists to make them better able to comprehend the origins of dental disease in terms of total-pathology and the sequelae of dental disease as observed at the bedside and in the operating room.

[1] Hospital Service in the United States; Thirteenth Annual Presentation of Hospital Data by the Council on Medical Education and Hospitals of the American Medical Association, J. A. M. A., Hospital Number, 104:1107 (March 30) 1935.

THE IMPORTANCE OF ROENTGENOGRAPHY IN BRIDGEWORK

JULIUS L. HENDLER, D.D.S.
New York

1A

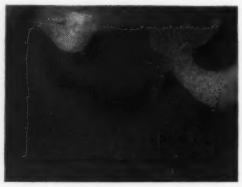
1B

1C

1D

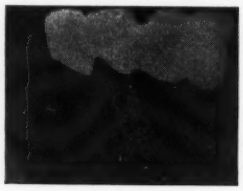
Fig. 1—A, Diffuse apical involvement of abutment tooth; B, definite apical involvement of abutment tooth; C, cystic area occupying pontic space under bridge; D, diffuse bone resorption under bridge.

2A

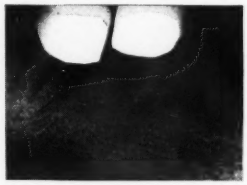


2B

Fig. 2—A, Resorption of an entire abutment tooth; B, resorption of an entire abutment tooth.



3A



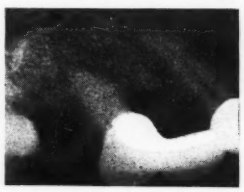
3B

Fig. 3—A, Severance of crown of abutment tooth from root as a result of caries; B, severance of root from crown of tooth as a result of caries.

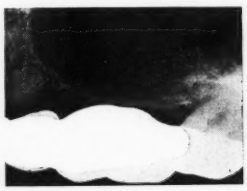
SINCE the advent of bite-wing roentgenography, too often does the dentist confine his routine roentgenographic examination to bite-wings, and perhaps to a few full films of pulpless teeth. Such practice is not advisable, because the patient believes that he has received a complete roentgenographic examination of the mouth, and too often apical infections, residual infections, impactions, and other dormant conditions are left unobserved until clinical symptoms arise.

Around bridgework and crowns are often found apical and lateral infection (Fig. 1). Many of the teeth are pulpless, and such teeth should be checked periodically with the roentgenogram for possible apical involvement.

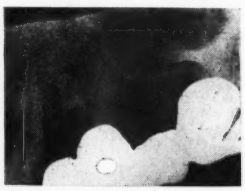
The pulps of abutment or crowned teeth may become necrotic as a result of trauma or during preparation, with subsequent apical infection which may give no clinical manifestations. In rare cases, resorption of an entire



4A



4B



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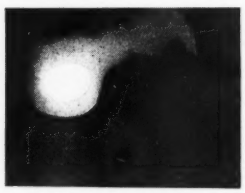
4D



4E

Fig. 4—A, B, C, D, and E, Retained roots under bridge.

5A

5B

5C

5D

5E

5E

Fig. 5—A, Upper cuspid impaction under bridge; B, unerupted upper cuspid under bridge; C, lower bicuspid impaction under bridge; D, upper cuspid impaction with involvement of abutment tooth; E, upper right and left cuspid impactions under bridge in the same patient.

abutment tooth may take place (Fig. 2). Poorly fitting abutments may give rise to lateral infection and decay, and this decay, if not checked, may completely sever the crown from the root of the tooth (Fig. 3).

Nor must we neglect the space occupied by the pontic, for it is not unusual to have a residual infection which may spread and cause further involvement unless checked. Of interest also are the number of roots (Fig. 4) and impactions (Fig. 5) found present in the pontic space, for bridgework in the past has been placed without roentgenograms of the abutment teeth or the edentulous areas to be restored. These roots and impacted teeth may give rise to infections, and may cause harm to the abutment teeth by pressure or otherwise.

Before bridgework is placed, roentgenograms must be taken of the abutment teeth and the pontic areas. A follow-up roentgenogram should be taken of bridgework already in place.

Chanin Building.

LETTERS TO THE EDITOR

Removal of Root Tips Fractured During Extraction

Any dentist who extracts teeth will encounter the problem of removing fractured root tips from the alveolar socket following some extractions. There are some types of roots that are known to present difficulties, but whether it is the upper first bicuspid or the lower third molar, the instruments described here will be found helpful.

Surgical extraction of teeth helps but does not insure removal in their entirety. Regardless of whether the tooth is removed surgically or not, the tooth should be slightly loosened in its socket before direct extraction "pull" and "feel" is exerted. Should a fracture occur, the root fragment will then be somewhat loosened before its actual removal is begun. Sometimes, however, despite the looseness of a root and its movement in the confined area, the root is difficult to remove. Herein lies a fault that is commonly found among practitioners. They at once resort to their instruments and perhaps they select root forceps or an elevator that resembles the forceps. Thus they keep on selecting instruments until the bracket is covered with them and still the root remains in its socket while the alveolus is broken into a thousand sequestra and the soft tissue is mutilated. Instead of "bone-crushers" or the lever type of elevators with working ends comparable to a spade; and instead of hammer and chisel, I use light instruments, with which little force can be exerted, for only the minimum amount of force should ever be tolerated. In selecting these instruments, I have found the right and left spoons, G. V. Black pattern, the most successful. There are elevators on the market that have the proper design but are too heavily constructed at the working ends; also the handles are made so as to permit enough force to be exerted not only to loosen any part of the human anatomy but actually to break the instrument itself. Some of these spoons have sufficient strength despite their thinness. We use rustless instruments for this work.

The "feel" that these light instruments convey to the fingers is far more important than the force exerted with the larger ones. These light instruments should be the first ones used when beginning root removal. Skill in their use rapidly develops and ordinary adeptness is all that is required to assure reasonable success.—F. J. Svoboda, D.D.S., *Cozad, Nebraska.*

Water Dispenser for Investing Inlays

I believe all dentists using an accurate system of investing inlays, and specifically, those using the Phillips Control System, will find definite use for a convenient method of placing room temperature water in the container on the scale or balance, in order to control the amount desired to the drop, without spilling any excess, and then, perhaps, having to add again. The device is simple. It is easily and quickly made and costs only a few cents.

1. Any glass bottle of one pint or more capacity is fitted with a rubber stopper (cork) having a hole about one fourth of an inch through it.
2. A piece of glass tubing about 2½ or 3 inches is forced into the hole in the cork with an inch extending.
3. To this extended portion of the tubing is fastened a piece of rubber tubing long enough to reach the section of the laboratory bench desired.
4. The free end is fitted with a tapered glass end which may be part of an ordinary eye dropper.
5. A rubber hose clamp is purchased at any druggist's or chemist's supply house for about fifteen cents and placed on the hose near the tapered glass end.
6. A small cut is made on the side of the rubber stopper with a file or knife so that air will get into the bottle and allow the water to flow.
7. The bottle is filled with water; the cork is forced tightly into the opening; the bottle is inverted and fastened to the wall with a piece of brass or copper strip, and the water dispenser is ready for use.
8. By pressing the hose clamp the amount of water can be controlled at will.

A bottle holding 10 ounces is sufficient for investing from fifteen to eighteen inlays in the average size ring.—Benjamin Krohn, D.D.S., *Chicago.*

(*Continued on page* 131)

THE IMPRACTICABILITY OF ORAL AND DENTAL STEREOSCOPY

C. L. MEISTROFF, D.D.S.
New York

TOO often clinical or office procedures are employed without question as to their practical worth; hardly any consideration is given the scientific principles on which they are based to ascertain whether a technique in question contributes to the diagnostic problem at hand. I have in mind the stereoscope in so far as its employment in oral or dental roentgenographic diagnosis is concerned. Through the use of this technique, one is supposed to obtain dimension through which depth, distance, and perspective can be appreciated, and thereby visualize the true relation of one structure to another and enable the observer to interpret location or position as lateral or mesial, buccal or lingual. It cannot be denied that this phenomenon is an optical illusion. We are directly concerned with a flat plane in which superimposed shadows have been reproduced. If the roentgenogram could present colors and an artificial depth, perspective, and distance between objects, as found in a painting, for example, then the stereoscope could be used to emphasize these qualities.

A roentgenogram is in itself a series of superimposed shadow-graphs; it must be realized, therefore, that there is neither depth nor distance. We obtain these when we resort to right angle roentgenography. Hold a jagged rock or irregular object in the hand and the various superficial irregularities are self-evident. Take photographs of these same objects and the resulting *flat-plane* reproduction does not give the original relation of object to *exterior*. The observer must content himself with surmising approximate relationship; that is, the distance between the rock and the back of the stand or table on which it stood. If a photograph is taken, however, at right angles to the line representing the distance between the edge of the table and the rock, a true picture of the distance is obtained. This is the principle underlying right angle technique (Figs. 1 and 2).

For example, assume that the patient is in the chair. The mouth is closed; the occlusal plane is almost parallel to the floor. Since we regard the occlusal plane as a straight line with the maxillary teeth above the line and the mandibular teeth below it, let us *actually* visualize this line by substituting a standard occlusal film for it. Place this in the patient's mouth. Face the patient. The occlusal plane can now be seen and the operator is now in a position to continue.

When the roentgen rays are directed down through the frontal portion of the skull and at right angles to the film a right angle exposure of the maxilla is accomplished (Fig. 9). This is a right angle view taken to visualize impactions.

When the rays are directed up from below the mandible and parallel with the alveolar ridge to visualize a mental fracture, a right angle exposure is made; when the rays are directed against the same film from below the mandible in an effort to locate mandibular salivary calculi, a right angle exposure is employed. When impacted mandibular cuspids or molars are present and we wish to determine their buccal or labial position, we direct the rays up from below the oral floor at right angles to the film, parallel with the alveolar ridge, which gives a right angle exposure.

Another example is the use of photography by aircraft during the World War. By taking pictures from a reasonable height in the air the gunners on land were able to calculate the distance between points, and the accuracy of this work was proved by the damage done (Figs. 3 and 4).

EXPERIMENT I

Place six test tubes or glasses or large-sized objects that can be stood on end in a straight line one behind the other. Leave a space of about 2 inches between numbers three and four, five and six. All others are close or together. Place a pencil between three and four and five and six. Now with the eye on the same level as the arranged objects, observe whether the following are possible:

1. How many of the upright objects are visible?
2. Are distances between them perceptible?
3. Can you tell exactly between what objects the pencils are located?
4. Can you visualize the extent or

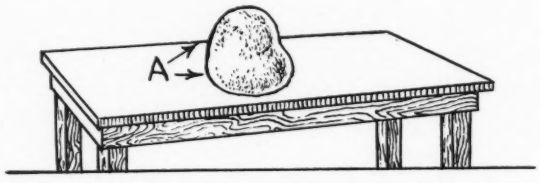


Fig. 1—A, the distance between the back of the rock and the farthermost edge of the table. "A" is not discernible because the rock and the edge are superimposed, and, as they are in the same plane as the line of vision, they block "A" out. The observer is in front.

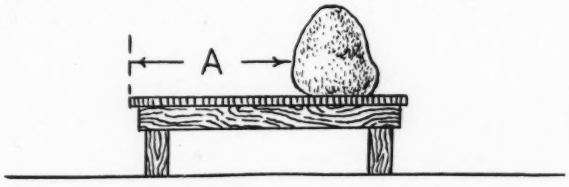


Fig. 2—A, the same rock and table edge viewed from the side. Note here that the distance, A, is exposed to full view. The difference between Figs. 1 and 2 shows the advantages obtained by using a right angle exposure, such as Fig. 2 exemplifies.

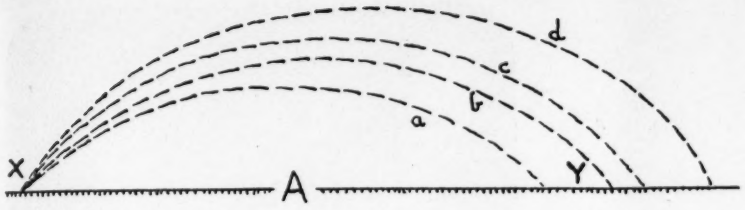


Fig. 3—A, the distance between two points; X, the gunners' position; Y, the target; a, b, c, and d are shots that have been fired but have not reached their mark. The distance, the gunners, and the target are in the same line of vision. The principle here applies to the situation in Fig. 1.

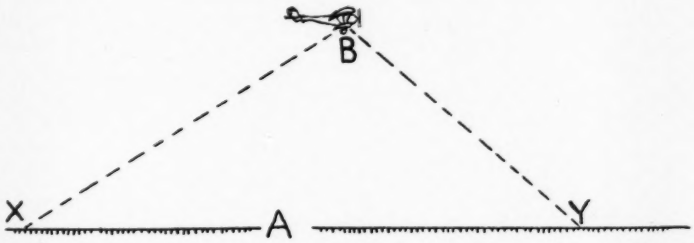


Fig. 4—A, the distance between X, the gunners' position, and Y, the target; B is the aerial observer. B has the same view that the reader had in observing Fig. 2; the fact that he is at right angles to the distance and at right angles to the line of vision in which the gunners are observing gives him a better perspective and a true distance.

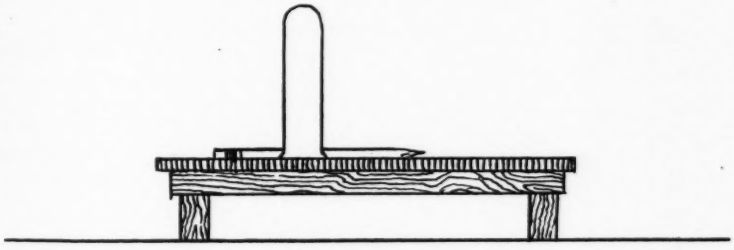


Fig. 5—The test tubes and pencils are in direct line with one another and the line of vision.

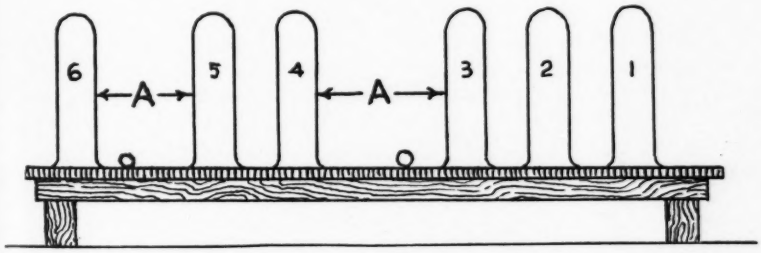


Fig. 6—The test tubes and pencils are now at right angles to the line of vision.

stretch of space covered by the objects? (Fig. 5).

Now observe these objects from the side (line of vision at right angles to the objects): they will be clearly seen; the distances between them will be perceptible; the pencils and their relation to the objects will be located. Note carefully that there is no depth or detailed dimension demonstrated, only inter-object relationship (Fig. 6).

When the stereoscope is used there is the illusion of depth of the surrounding material but the intimate relation of each structure to the other is absent.

Experiment II

Hold up the hand with the fingers out-stretched and with the hand in the direct line of vision, close one eye and see whether it is possible to tell which fingers are separated; which are together; what the distance between them is, and what the length of the fingers (Fig. 7). Now turn the hand so that it is at right angles to the line of vision (parallel with the forehead) and make the observations just mentioned. This shows the advantage of right angle exposures (Fig. 8). A stereoscope would never show what has just been observed.

Roentgenography and Stereoscopy Compared

A roentgenogram may show, for instance, a completely impacted lower third molar with its crown and the second molar distal root superimposed. If the root is bifurcated and the crown is between the roots or on each side of the buccal or lingual bifurcation, extreme difficulty exists when interpretation demands exact location. It is impossible to make a diagnosis with the stereoscope. A right angle exposure would give a more accurate picture of the relationship.

A roentgenogram in another case may reveal an impacted tooth located in the maxillary sinus. Stereoscopy does not present an informative picture to the operator to enable him to treat the patient properly. One cannot determine dimension, depth, or perspective from stereoptican films.

An occlusal roentgenogram; a view of the skull in the dorso-ventral position for the sinuses; a lateral view of the maxillary sinus, and an intra-oral roentgenogram—these give one more information than can be obtained by the stereoscope. The reason for this is that the exposures give data taken from more than one angle: right angle roentgenography.

To attempt to locate a tooth by means of the stereoscope; to take duplicate films of the same area and expect dimension, distance, perspective, and structural relation to be shown is too much for one film to fulfill. Even the most experienced roentgenologist will give his opinion only when a right angle exposure has been made.

In the case of impacted teeth, views taken of a single area by the shift technique, going from right to left through each eye-line and observing

Fig. 7—Fingers held away from the face and parallel with the direct line of vision.

Fig. 8—Fingers held up at right angles to the line of vision.

Fig. 9—Right angle exposure of maxilla.

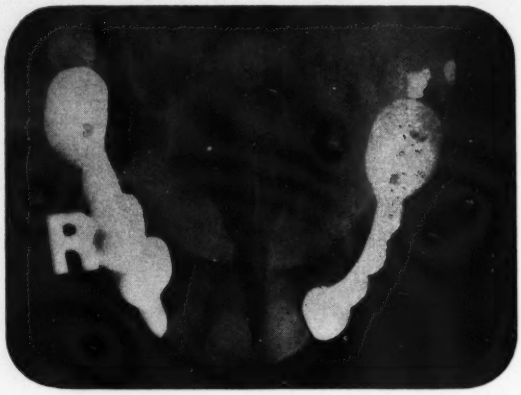


Fig. 9

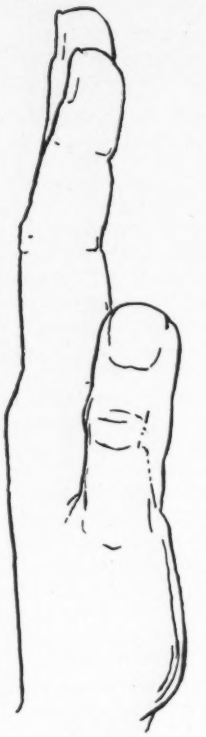


Fig. 7

Fig. 8

the direction of shadow movement, will inform the observer whether the tooth in question is located buccally or lingually. This technique is better in all respects than stereoscopy.

40-39—102 Street,
Corona, Long Island.

I have seen cases in which impacted lower bicuspids or cuspids were interpreted as being on the lingual because the impaction was clearer. Right angle exposure revealed the true position (buccal) in the mandible. Because of heavy overlying bone tissue in some cases, characteristics are imparted to the film that lead the operator to believe that the tooth in question is located buccally because of its poor definition and lack of sharpness of outline with poor detail. Right angle roentgenography is the solution to this problem.

When two dense structures overshadow each other and there is a superimposition of cancellous reticulum with two dense outer osseous plates, too much is placed in the way for a stereoscopic examination to reveal. Either a shifting technique or a right angle exposure will provide the operator with dependable information.

Conclusions

1. Stereoscopy has no practical application to dental or oral roentgenology.

2. Stereoscopy does not give a true perspective, depth, dimension, or distance of or between structures because these phenomena are optical illusions.

3. Right angle roentgenography and shifting technique are far more productive of diagnostic results.

ANALGESIA IN DENTISTRY

JESSE SCHNITZER, D.D.S.
New York

OF THE various methods of pain elimination in the preparation of teeth for restorations and for use as abutments in bridgework, a great deal of success has been reported by those who employ analgesia which is induced by the nitrous oxide and oxygen gas apparatus.

Analgesia is the initial stage in the induction of surgical anesthesia by means of nitrous oxide and oxygen. It is characterized by relief of pain while consciousness is retained. During the induction of surgical anesthesia with nitrous oxide and oxygen the stage of analgesia is not apparent to the patient; there are no subjective symptoms owing to the fact that during induction the patient passes through this stage so rapidly. During a prolonged analgesia, after a few minutes, the patient experiences a peculiar languid feeling in the lower extremities which gradually moves upward to the hands and arms and thence to the mouth, tongue, and lips. The tongue feels thick and clumsy. The patient is aware of everything that is going on around him and for that reason has more confidence; the operator merely suggests to the patient what acts he wishes the patient to perform. The patient experiences a sensation of warmth and well being. The feeling is similar to that which one undergoes in imbibing an alcoholic beverage freely.

The technique for inducing and maintaining analgesia for cavity and abutment preparation is simple. There is on the market a machine that is used exclusively for inducing analgesia; the machine used for inducing surgical anesthesia may also be used for inducing analgesia, thus serving a double purpose. The technique employed varies with the apparatus the operator is using.

Technique

Analgesia Apparatus—The technique for inducing and maintaining analgesia with the analgesia apparatus is as follows:

1. The patient is seated in the chair in a comfortable position. Everything possible should be done to put the patient at ease. The operator should explain briefly to the patient what he wishes to accomplish; how he is going to proceed to do it, and what he expects of the patient.

2. The nasal inhaler is next adjusted to the patient. On the nasal inhaler are two valves, one the exhaling valve, the other the air valve. The air valve is so marked. Both valves are permitted to remain open when the induction of analgesia is begun. All adjustments for the variable degrees of analgesia are made by the air valve.

3. The exhaling valve is disregarded throughout analgesia.

4. The gases are now turned on, the oxygen dial is turned up to 20 per cent and the nitrous oxide to ¾, which means that the patient is receiving a flow of gases at the rate of ¾ per gallon per minute. This adjustment is an advantage in that the flow of gases to the patient can be controlled, so that the patient is able to breathe normally without having the feeling that he is being forced to breathe; at the same time this adjustment conserves the gases.

5. The tubing from the gas machine is connected with the nasal inhaler, and the patient is instructed to breathe naturally and slowly through the nose.

There is a certain amount of oxygen that the patient receives from the atmosphere through the opening of the air valve. For that reason it is difficult to give definite percentage of the gases that the patient is breathing to induce analgesia.

6. If the patient appears to be reacting too slowly to the gases, the air valve on the nasal inhaler is closed down slightly to diminish the supply of oxygen coming from the atmosphere, and thus the patient is permitted to breathe the gases once again; conversely, if the patient appears to be going too rapidly into the analgesic stage the air valve is opened to permit more air to enter; this will lighten the mixture. The mixture is rarely adjusted and is left at the markings as given. Adjustments are made by the air valve on the nasal inhaler.

The patient is reassured by the operator all the time he is breathing the gases. The operator should anticipate the feeling the patient will experience while passing into the analgesic stage, and forewarn him; the patient should also be told that he will not be permitted to lose consciousness.

Anesthesia Apparatus—The difference in technique in using the surgical anesthesia apparatus for analgesia varies in a few minor details:

1. The oxygen dial is turned up to 20 per cent as when the analgesia apparatus is used.

2. The nitrous oxide dial, which is on the operator's right as he faces the machine, is turned up to the black "V."

3. There is a dial on the machine in front of and between the oxygen and nitrous oxide dials which is marked "gallons N_2O per minute." The front of this dial is calibrated with numerals from 1 to 5. For inducing and maintaining analgesia the hand of the dial is placed on 1. This indicates a flow of gases equivalent to 1 gallon per minute.

4. The manipulation of the nasal inhaler remains the same as when using the analgesia apparatus.

5. The operator depends chiefly on the patient to give the sign of analgesia: If the tooth is badly decayed and extends deeply into the dentine, the analgesia is tested by probing the decayed area with an explorer. The analgesic stage has not been arrived at if the patient winces. Also, when the operator is opening into a fissure cavity in a tooth, if the patient experiences pain during the use of the bur, complete analgesia has not been induced. Both these conditions can be remedied by turning down the air valve that decreases the oxygen in the mixture.

Too much talking or laughing by the patient will have a tendency to bring him out of the analgesic stage. During the operation the operator may have a feeling that the patient will have pain while the bur is used in a sensitive area of the tooth. This anxiety may be overcome by instructing the patient to take at least three deep breaths by nose before the operation is continued.

Drooping of the lower jaw is another sign of analgesia.

In order not to overheat the tooth and thus cause trauma the same precautions should be exercised in the use of analgesia for preparation of cavity restorations and abutments as when other methods for relief of pain are used.

55 West Forty-Second Street.

ADVANTAGES

The advantages of analgesia are many. The patient does not need preliminary preparation before its induction. There are no ill effects postoperatively and the patient is able to go about his duties immediately after having received analgesia. In analgesia the patient will experience pain when the pulp is too closely approached and he is thus able to warn the operator. The likelihood of exposure and traumatization of the pulp are thus lessened.

HYPERSENSITIVE DENTINE

I. EXPLANATION OF TERM:
1. Hypersensitiveness of dentine implies an uncommonly sensitive or painful response of the exposed or partly exposed dentine to an irritation.
2. This includes dentine exposed by
   a. caries;
   b. attrition;
   c. abrasion or erosion;
   d. failure of the enamel to meet the cementum;
   e. marked atrophy of the alveolar process, exposing both dentine and cementum.

II. TYPES OF MEDICAMENTS:
1. All are caustics.
2. Potentially dangerous agents which may destroy the pulp are
   a. solutions of potassium or sodium hydroxide;
   b. self-limiting drugs, such as zinc chloride, paraformaldehyde, or arsenic trioxide.
3. Safe medicaments, if intelligently applied are:
   a. silver nitrate;
   b. solution of formaldehyde;
   c. sodium potassium carbonate;

III. REQUIREMENTS OF MEDICAMENT:
1. no undue irritation or danger to the pulp;
2. painless on application or shortly afterward;
3. easy application;
4. rapid action;
5. permanent effectiveness;
6. should not discolor tooth structure.

IV. METHOD OF TREATMENT:
1. Preparation of Hypersensitive Area:
   A. Rid hypersensitive area of its coating of food débris, fatty matter, mucin, etc. in order to expose dentinal fibrils to action of medicament.
   B. Clean tooth thoroughly with pumice paste:
      a. coarse abrasive is preferable to fine abrasive;
      b. abrasive should wash away readily;
      c. abrasive should be too large to clog dentinal tubules.
   C. Syringe teeth or spray with warm water to wash away abrasive and remaining foreign matter.
   D. Teeth in affected area are isolated with rubber dam or cotton rolls.
   E. Tooth to be treated is thoroughly dried with cotton and warm air.
   F. If rubber dam cannot be used and profuse flow of saliva hinders work, one-one-hundredth grain atropine sulphate may be given patient three hours and again an hour and a half before treatment.
   G. Exposed hypersensitive dentine is swabbed thoroughly with
      a. a benzyl alcohol-chloroform solution (equal parts) or
      b. pure benzyl alcohol followed by chloroform.
2. Medication:
   A. *Silver Nitrate*
      a. can be used in posterior teeth, on the cemento-dentinal surfaces exposed by gingival and alveolar atrophy.
      b. can be used in anterior teeth, on the lingual surfaces and on abrasion or erosion areas on the buccal or labial surfaces.
      c. should not be used where only a thin layer of dentine covers the pulp, as it might penetrate into and destroy the pulp.
      d. should not be used where decided black stain produced is objectionable.
      e. is most effective drug; produces effect by
         (1) causing superficial destruction of protoplasm in dentinal tubules;
         (2) forming a solid precipitate to shut off dentinal fibrils from external irritation.
      f. does not have deep penetration but effective.
   B. *Solution of Formaldehyde*
      a. *can* be used on the exposed surfaces of anterior teeth;
      b. where for esthetic reasons a nonstaining agent is necessary;
      c. in hypersensitive decalcified areas on the labial surfaces of anterior teeth which do not require restoration;
      d. in shallow abrasion or erosion cavities;
      e. where enamel and cementum do not meet, the dentine being exposed;
      f. where the rubber dam can be applied so as to protect the gingival tissue from destructive effect.
      g. Solution of Formaldehyde *cannot* be used where dentine covering pulp is thin, nor in deep erosion cavities, nor in cases of marked attrition.
      h. Solution of Formaldehyde is preferably applied with an orangewood stick, with a beveled edge like that of a hypodermic needle, to the hypersensitive area, and rubbed with some pressure over the affected surface for five minutes.
      i. After the formaldehyde solution is applied, the gingiva should be washed lightly with ammonium acetate solution U.S.P. This will neutralize the effect of any accidental contact of the formaldehyde with the gum tissue.

C. *Sodium-Potassium Carbonate*
   a. is indicated where dentine overlying the pulp is thin;
   b. may be used in hypersensitiveness due to attrition, erosion, or abrasion;
   c. when a nonirritating caustic is desired.
   d. is contra-indicated: in areas of mouth where it cannot be burnished with an engine burnisher or orangewood stick.
   e. is not so useful for desensitizing exposed dentine between enamel and cementum or disto-lingual or disto-buccal areas.
   f. is made into a paste by triturating in a mortar 1 part sodium carbonate C.P. crystals with 4 parts potassium carbonate powder U.S.P. This should be preserved in a well-stoppered bottle after the addition of a few drops of glycerine to maintain consistency of paste.
   g. Hypersentitive area is prepared.
      Paste is applied to affected area; burnish over surface for five minutes with intervals of rest.
      Area is dried with cotton.
      A protective varnish (gum copal or gum mastic, 1 part; gum sandarac, 4 parts; alcohol, 16 parts) is applied.
   3. Subsidiary Treatment: *Alkaline Mouthwash (Warm)*: Effective for temporary attacks of hypersensitiveness of dentine:
      a. after eating citrus fruits;
      b. during states of lowered vitality or mental distress;
      c. during menstruation or pregnancy.
      d. in infection of upper respiratory tract.

[*Adapted by* THE DENTAL DIGEST, *with permission, from the Council on Dental Therapeutics, J.A.D.A.: Grossman, Louis I.: The Treatment of Hypersensitive Dentin, J.A.D.A.* **21**:2050 (*November*) 1934.]

LETTERS TO THE EDITOR

(*Continued from page* 125)

ILLUSTRATED BOOK FOR PATIENT EDUCATION

I have been interested in the educational pictures that have been published in THE DENTAL DIGEST, first, because I think we can explain our story to the patient better by having something by which they can visualize what we have to tell them, and second, it enables the dentist to have a plan by which he can explain this story in a concise manner.

I have been interested in the problem of educating the public to have a better understanding of the general principles of dentistry and have sought all sources of material. My analysis of the question is that the best means of giving out dental information is by the dentist to his patient. I know that to some extent this is being done but more could be done if throughout the dental profession more effort were given to educating the patient.

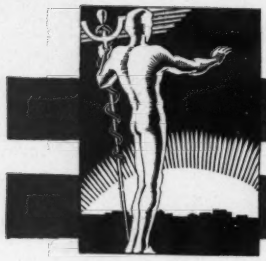
As chairman of the committee on educational work in my state, I am making an effort to find something with which the dentist may explain his subject better; that is, *a story in pictures on every phase of dentistry.*

The booklet that you published with the educational pictures (THE EDUCATION OF THE DENTAL PATIENT) was very good, but I would like to know whether a more complete book could be made up which would cover all phases of dentistry. This book could be indexed on the edge so that any subject could be referred to immediately. I have such a book that I have compiled for the most part from cuts taken from the DIGEST.

The subjects I have covered, including the educational pictures, are: (1) eruption of teeth with roentgenograms, showing all stages of eruption of decidious and permanent teeth; (2) decay, several photographic views and roentgenograms; (3) infections, apical; (4) pyorrhea around impactions, third molars, eruptions; (5) loss of teeth; malocclusion with illustrations of before and after treatment in orthodontia; (6) dentures: facial forms; types of ridges showing hard and soft tissue; (7) nerves supplying teeth and face; illustration to be used in explaining anesthesia; (8) prophylaxis, showing stains on the teeth and deposits; at least two methods of tooth brushing and care of toothbrush.

These subjects are an example of what I have in mind. I would like to know whether such a book could be published. I know of nothing along this line and as much thought is being given to dental education at this time, this may be of interest to other state societies.—C. T. FLEETWOOD, D.D.S., *Seattle, Washington.*

NOTE: The Editor will be glad to receive opinions from readers concerning the value of a book of educational pictures as suggested by Doctor Fleetwood. Ideas for presentation will be considered.



The DENTAL SCENE

DENTAL CARIES AND THE COMIC

WHILE I am in no sense a hypochondriac, I have had the unpleasant experience of imagining the presence of certain typical symptoms of one dread disease or another—not without reason, however. It is hardly possible for a manuscript editor with a remnant of impressionability to read fifty manuscripts or more on the subject of cancer without feeling around for "lumps." Thus it was when medical manuscripts commanded my attention, and thus it was when articles on dentistry first became my concern. I could not rest until I had a full mouth roentgenogram taken to prove that my teeth were vital. Pyorrhea became the bogey man and impacted third molars the scarecrow. I lived through these horrors only to have dental caries loom up portentously. Although the disease was not manifest, I began to wonder to which authority I would turn for help should I suddenly become a victim of rampant caries.

The cocksureness of reputable authors, on a debatable question, parading their theories in contradiction to one another, and the controversy bursting through journals and deluging the mail, soon turned candid wonder into discrediting skepticism. That earnest investigators should take on so much of the color and style of the charlatan or radio announcer of nostrums, and utter the pedantic superficialities of Molière "doctors," in reporting their facts or expounding their theories is disillusioning to the lay mind that is trying hard not to be gullible but at the same time would like to believe that in the twentieth century science has shed its ludicrous coat of unsubstantiated claims.

The whole subject of dental caries forms a typical pitfall for what has been called the *professional comic,* a category of the laughable. The professional comic describes a situation in which (1) typical characteristics of a particular profession and of no other abound: all expression is confined to professional jargon; (2) professional logic strains itself only to become an absurdity (that is, the fact must fit the theory; the theory cannot err; the blunder is in experience itself, not in the methods of the investigators); (3) fixed ideas or obsessions give rise to a blindness in which the investigator sees only what he wants to see; (4) professional vanity cloaks itself in solemity; (5) patients seem to be made for investigators who know what they will find before experiments are begun and Nature becomes a conflicting nuisance, a vestigial remnant, but not so easily removed.

Although I try to respect the efforts of research workers in the field of dental caries and hope for their success, there is a persistent comic scene that comes to mind: Dental Caries itself becomes the victim at the mercy of contradictory Contentions vying with one another to be the victor at a Round Table in which the following discussion takes place:

ELECTROLYSIS: I declare, I am the cause of Caries. Dental investigators had better pay attention to me or "some good electroplater will come along and solve the problem to the embarrassment of the dental profession. The mouth, indeed, is a galvanic cell, the saliva the electrolyte, and the teeth, electrodes. If they become strong enough, salts are taken from one tooth resulting in a cavity, and are deposited in another, causing it to harden, and, if in excess, forms calculus. To conteract my action the mouth should be dried; the flow of saliva must be altered and diminished, or I will make Caries progress unchecked."

NUTRITION: Not you, but I am the cause of Caries; I change my form and elude the investigators. They suspect me but they cannot catch me. One research worker thinks I am *Sugar,* because to him I have appeared in that guise. I have heard him say, "A salivary stasis interferes with the flow of saliva over the tooth surface occasioned by either a fatty mucinous deposit or by capillary force. Within the area of stasis, Sugar is retained, bacterial fermentation of Sugar results—lactic acid which because of the stasis is not washed away or diluted decalcifies enamel."

That is very droll, but listen to this: One day I jumped into the test tubes of some workers in the form of *Phosphorus,* and now they speak glibly about *Phosphorus* being leached out of the bones and teeth, resulting in pyorrhea in the one instance and Caries in the other when the diet is deficient in *Phosphorus.* Yes, I am having a great deal of fun, I have even been the subject of slogans: "A well nourished tooth never decays." "Drink a pint of orange juice a day and you'll forget what the dentist's chair looks like." And I have another trick: I turned up in a milk bottle one day and now there are claims to eliminate Caries in children by adding raw milk to their daily ration. The next day I was busy frolicking in some food that was cooking, and what do you think happened? There was a proclamation condemning the use of milk in the diet and advocating a raw base-forming diet instead. I have even transformed myself into a *Calcium* paste to be applied to the teeth nightly to prevent decay. That was in one of my more charitable moods.

HEREDITY: I must admit *Nutrition,* you are clever; but with all your tricks, those research workers can never completely forget me. When you have failed them, they begin to reckon with me in this manner: "The most enthusiastic proponent of the dietary deficiency theory as the cause of tooth decay does not expect every child to be perfect dentally whose mother, during pregnancy and lacation received an ideal dental diet. The influence of *Heredity* is too strong to admit of this being possible except after several generations in which the dietary requirements have been strictly met." And so, I become the Great Destroyer.

(*Continued on page* 137)